Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Consultant Design				
Action	Info	Routing	Attach	Initial
		Date 1/10/07		
	✓	Bureau Chief		
		Consultant plans Eng		
	✓	Design Supervisor		
		CTEP Engineer		
	✓	ALL ENGINEERING STAFF		
	✓	ALL DESIGN CONSULTANTS		
	✓	File		

Memorandum

To: Distribution

From: Paul Ferry, P.E.
Highways Engineer

Date: January 8, 2007

Subject: Road Design Manual – Chapter 9: Superelevation

The metric superelevation table; Figure 9.3A (metric), in Chapter 9 of the December 2004 version of the Road Design Manual was inadvertently revised to match the 2004 version of AASHTO's *A Policy on Geometric Design of Highways and Streets*. Our intent was that all metric design of horizontal curves would continue to follow Figure 9.3A from the December 2000 of the Road Design Manual, and this figure should have been included in the December 2004 version. Use of the new values would have required substantial unwarranted revision to existing designs.

Therefore, replace Figure 9.3A (Metric) with the attached figure. This figure is also available in the electronic version of the 2004 Road Design Manual on the web site.

Figure 9.3B (Metric) Multilane Highways; Open Roadways, that is currently in the 2004 Road Design Manual is correct.

If you have any questions concerning this change, please contact me at 444-6244.

Attachment

Distribution:

Lesly Tribelhorn,	Highways Design Engineer	
Damian Krings,	Road Design Engineer	w/attachment
Tom Martin,	Consultant Design Engineer	"
Lisa Durbin,	Construction Administration Services Engineer	"
Paul Jagoda,	Construction Engineering Services Engineer	"
Duane Williams,	Traffic & Safety Engineer	"
Suzy Price,	Chief – Contract Plans Bureau	"
Jim Frank,	Glendive District Engineering Services Supervisor	"
Gary Neville,	Billings District Engineering Services Supervisor	"
Joe Olsen,	Butte District Engineering Services Supervisor	"
Shane Stack,	Missoula Acting District Engineering Services Supervisor	"
Steve Prinzing,	Great Falls District Engineering Services Supervisor	"
Bryan Vieth,	Consultant Design Bureau	"

John Cornell,	Road Plans Checker	"
Kevin Farry,	Road Plans Checker	"

e	V = 50 km/h			V = 60 km/h			V = 70 km/h		
	R(m)	Trans. Length		R(m)	Trans. Length		R(m)	Trans. Length	
		L(m)	TR(m)		L(m)	TR(m)		L(m)	TR(m)
NC	R ≥ 1090	0	0	R ≥ 1495	0	0	R ≥ 1970	0	0
2.0%	1090 > R ≥ 795	30	30.00	1495 > R ≥ 1095	35	35.00	1970 > R ≥ 1445	40	40.00
3.0%	795 > R ≥ 500	30	20.00	1095 > R ≥ 700	35	23.33	1445 > R ≥ 925	40	26.67
4.0%	500 > R ≥ 350	30	15.00	700 > R ≥ 490	35	17.50	925 > R ≥ 650	40	20.00
5.0%	350 > R ≥ 260	30	12.00	490 > R ≥ 365	35	14.00	650 > R ≥ 490	40	16.00
6.0%	260 > R ≥ 190	35	11.67	365 > R ≥ 270	40	13.33	490 > R ≥ 370	40	13.33
7.0%	190 > R ≥ 135	40	11.43	270 > R ≥ 200	45	12.86	370 > R ≥ 275	50	14.29
8.0%	135 > R ≥ 80	45	11.25	200 > R ≥ 125	50	12.50	275 > R ≥ 175	55	13.75
	R_{min} = 80 m			R_{min} = 125 m			R_{min} = 175 m		

e	V = 80 km/h			V = 90 km/h			V = 100 km/h		
	R(m)	Trans. Length		R(m)	Trans. Length		R(m)	Trans. Length	
		L(m)	TR(m)		L(m)	TR(m)		L(m)	TR(m)
NC	R ≥ 2440	0	0	R ≥ 2965	0	0	R ≥ 3625	0	0
2.0%	2440 > R ≥ 1795	45	45.00	2965 > R ≥ 2185	50	55.00	3625 > R ≥ 2675	60	60.00
3.0%	1795 > R ≥ 1170	45	30.00	2185 > R ≥ 1400	50	33.33	2675 > R ≥ 1750	60	40.00
4.0%	1170 > R ≥ 825	45	22.50	1400 > R ≥ 1000	50	25.00	1750 > R ≥ 1250	60	30.00
5.0%	825 > R ≥ 620	45	18.00	1000 > R ≥ 770	50	20.00	1250 > R ≥ 950	60	24.00
6.0%	620 > R ≥ 475	45	15.00	770 > R ≥ 600	50	16.67	950 > R ≥ 750	60	20.00
7.0%	475 > R ≥ 360	55	15.71	600 > R ≥ 465	55	15.71	750 > R ≥ 590	60	17.14
8.0%	360 > R ≥ 230	60	15.00	465 > R ≥ 305	65	16.25	590 > R ≥395	65	16.25
	R_{min} = 230 m			R_{min} = 305 m			R_{min} = 395 m		

e	V = 110 km/h		
	R(m)	Trans. Length	
		L(m)	TR(m)
NC	R ≥ 4180	0	0
2.0%	4180 > R ≥ 3095	65	65.00
3.0%	3095 > R ≥ 2000	65	43.33
4.0%	2000 > R ≥ 1465	65	32.50
5.0%	1465 > R ≥ 1140	65	26.00
6.0%	1140 > R ≥ 900	65	21.67
7.0%	900 > R ≥ 735	65	18.57
8.0%	735 > R ≥ 500	70	17.50
	R_{min} = 500 m		

e_{max} = 8.0%

Key:

R = Radius of curve, m

V = Design speed, km/h

e = Superelevation rate, %

L = Minimum length of superelevation runoff (from adverse slope removed to full super), m

TR = Tangent runout from NC to adverse slope removed, m

NC = Normal crown = 2.0%

Note: See Figure 9.2C for typical selection of curve radii.

RATE OF SUPERELEVATION AND MINIMUM LENGTH OF TRANSITION (Two-Lane, Two-Way Highways; Open Roadways)

Figure 9.3A (Metric)